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PIARC TC 4.4, Bridges and Related Structures

Topic 2:

INCREASE OF DURABILITY AND LIFETIME OF EXISTING BRIDGES

Working group

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Content

1. The idea of the study
2. Limitation
3. Data collection
4. Analysis of data
5. Examples
6. Exploitation of the study

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The idea of the study (1)

Detect methods about:

- Increase durability and lifetime
 - Minimize maintenance cost
 - Minimize traffic restrictions during repair works
- through suggesting new, alternative repair/rehabilitation methods



The idea of the study (1)

Detect methods about:

- Increase durability and lifetime
- Minimize maintenance cost
- Minimize traffic restrictions during repair works

FOCUS ON EXISTING BRIDGES

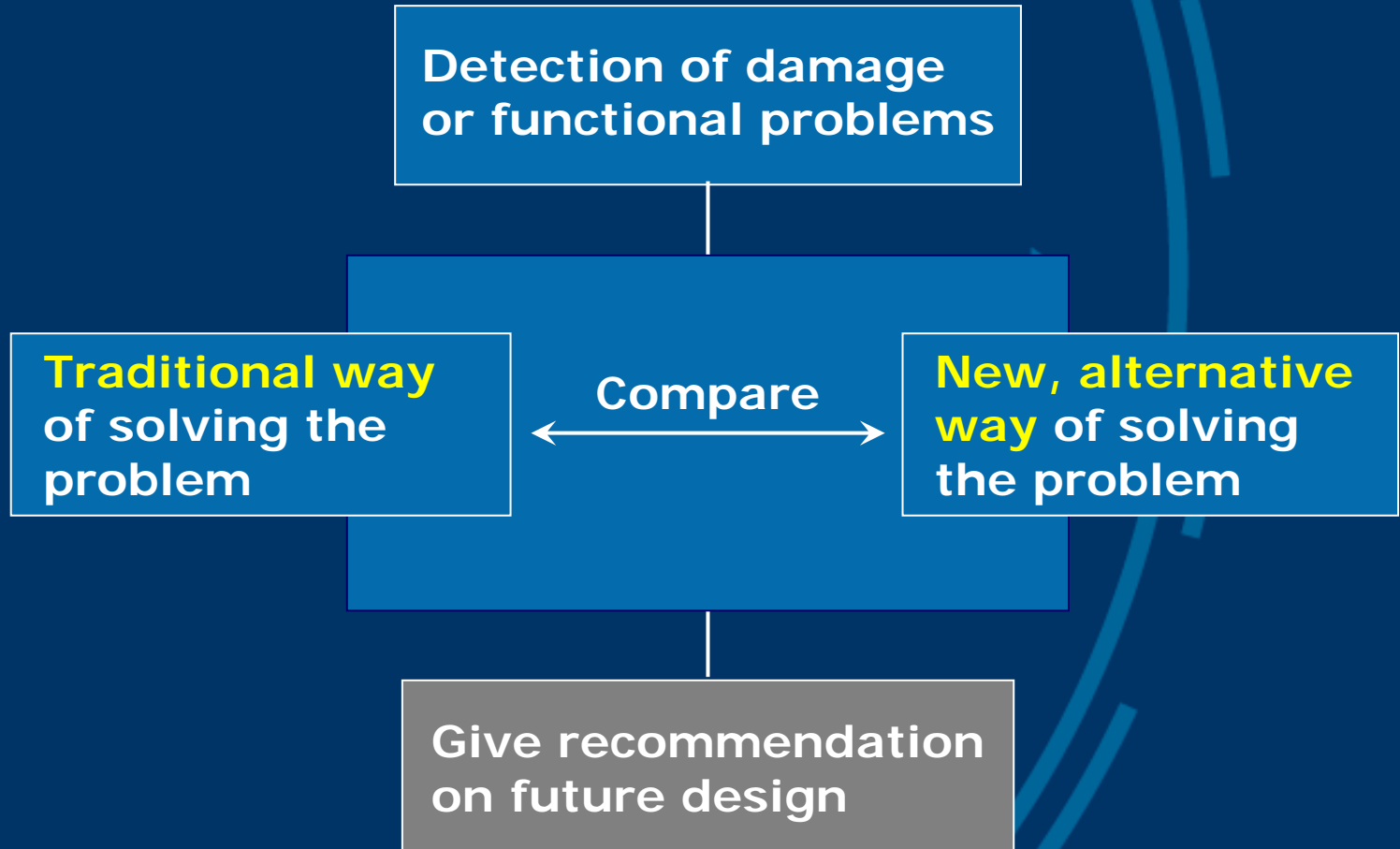
- through suggesting new, alternative repair/rehabilitation methods

The idea of the study (2)

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Limitation of the study (1)

“Existing bridges” include:

- Road and pedestrian bridges
- Traffic tunnels < 100 metre
- Retaining walls
- Culverts
- Protection galleries

Limitation of the study (2)

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**“Structural components”
include:**

- **Superstructure**
- **Substructure**
- **Bridge components/furniture
(Expansion joints, bearings
etc.)**

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Data collection (1)

Questionnaire forwarded to:

**PIARC TC 4.4 members and
corresponding members**

**(approx. 70 persons in 33
countries)**

Data collection

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49 RESPONSES/EXAMPLES from 22 countries/regions:

- Switzerland
- Finland
- USA, Virginia
- Canada, Quebec and Ontario
- Belgium, Flanders and Walloon
- Austria
- Romania
- Hungary
- Sweden
- Poland
- Slovenia
- Italy
- Lithuania
- Denmark
- Japan
- Norway
- United Kingdom
- South Africa
- New Zealand
- Spain

Type of responses/examples:

- Precast elements used **instead** of in-situ replacement of bridge deck
- Application of cathodic protection to stop further corrosion **instead** of carrying out of traditional concrete repairs
- Applying of probability-based capacity calculations **instead** strengthening the pile foundation

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Analysis of data

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Extent:

- 49 responses/examples from 22 countries

Problem:

- How to sort and present the responses/examples?
?.....

Analysis of data

Division, 4 main groups:

- 1. Whole bridge/culverts
- 2. Superstructure, slab and beams
- 3. Substructure, pier and foundation
- 4. Bridge components/furniture

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Analysis of data

The 4 main groups are divided into 3 subgroups (problems):

- **Insufficient load carrying capacity**
- **Deterioration**
- **Insufficient serviceability**

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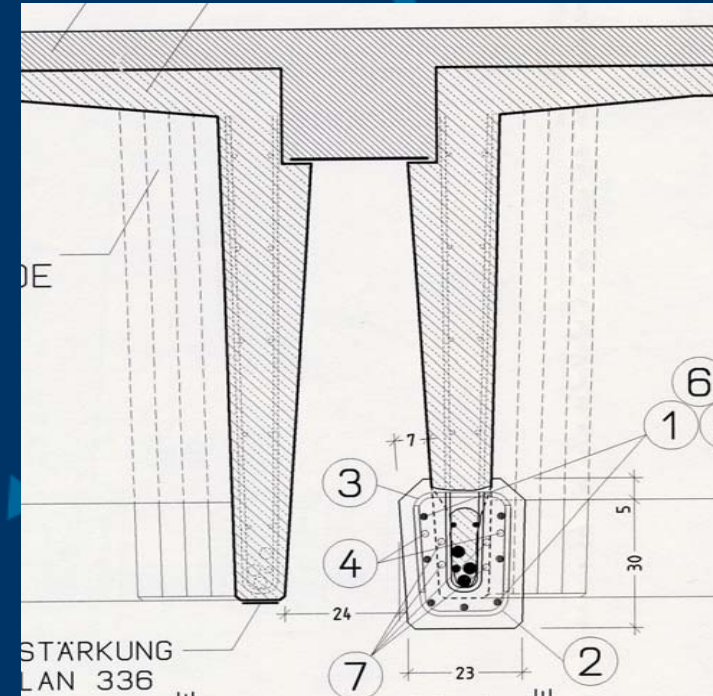
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Example

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Strengthening with carbon fibre lamellae **instead** of concrete "shoe" with post tension cables

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Re-lining of a corrugated steel culvert
instead of construction of a new bridge

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All lanes are closed for a certain period
instead
of closing lane by lane in off-peak hours¹⁷s

Example

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Preparing a bridge-over-bridge and working day and night **instead** of only night work for replacement of expansion joints

Exploitation

Report incl. an inventory or library of examples of:

- Increasing of durability and lifetime
- Minimizing maintenance cost
- Minimizing traffic restrictions during repair works

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Exploitation

Report present recommendations to avoid the same damage or problem occurring in the future.

– don't make the same mistake again!

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Exploitation

TC 4.4's hope/expectation:

Inspire agencies, consultants
and contractors

- to select optimal
maintenance solutions

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**Thank you for
your attention!**